10CFR50.73

Virginia Electric and Power Company
North Anna Power Station
P. O. Box 402
Mineral, Virginia 23117

July 29, 2003

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555-0001

Serial No.: 03-369
NAPS: MPW
Docket No.: 50-338
License No.: NPF-4

Dear Sirs:

Pursuant to 10CFR50.73, Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to North Anna Power Station Unit 1.

Report No. 50-338/2003-004-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to the Management Safety Review Committee for its review.

Very truly yours,

DAHeacock

D. A. Heacock, Site Vice President
North Anna Power Station

Enclosure

Commitments contained in this letter: None

cc: United States Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23 T85
Atlanta, Georgia 30303-8931

Mr. M. J. Morgan
NRC Senior Resident Inspector
North Anna Power Station

IE22

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 **EXPIRES 7-31-2004**

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
NORTH ANNA POWER STATION , UNIT 1	05000 - 338	1 OF 5

TITLE (4)
Automatic Reactor Trip Due to Main Transformer Fault

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCUMENT NUMBER 05000-
06	11	2003	2003	-- 004 --	00	07	29	2003	FACILITY NAME	DOCUMENT NUMBER 05000-

OPERATING MODE (9)	1
POWER LEVEL (10)	100 %

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	20.2203(a)(1)		50.36(c)(1)(i)(A)	X	50.73(a)(2)(iv)(A)		73.71(a)(4)
	20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)
	20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A	
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)		50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
D. A. Heacock, Site Vice President	(540) 894-2101

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	EA	XFMR	M175	Y						

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On June 11, 2003, at 1453 hours with Unit 1 operating at 100 percent power an automatic reactor trip occurred as a result of a main transformer fault. The initiating signal was the Main Transformer Lockout Relay Turbine Trip resulting in a turbine trip/reactor trip. The cause of the main transformer fault was an unused electrical lead disengaging from the no-load tap changer and coming in contact with the transformer casing. At 1718 hours, a 4 hour Non-Emergency Report was made to the NRC in accordance with 10 CFR 50.72 (b)(2)(iv)(B). An 8 hour Non-Emergency Report was also made to the NRC in accordance with 10 CFR 50.72 (b)(3)(iv)(A). This event is reportable pursuant to 10 CFR 50.73 (a)(2)(iv)(A) for a condition that resulted in an automatic actuation of any engineered safety feature including the reactor protection system. This event posed no significant safety implications because the Reactor Protection and Engineered Safety Feature systems functioned as designed following the reactor trip. Therefore, the health and safety of the public were not affected by this event.

1.0 DESCRIPTION OF THE EVENT

On June 11, 2003, at 1447 hours, with Unit 1 operating at 100% power, the Fire Protection Deluge System (EIIS System KP) for the "C" Main Transformer (EIIS System EA, Component XFMR) actuated and the Main Control Room (MCR) received indication of a Fire Pump (EIIS Component P) start. Operations personnel were dispatched to the transformer to determine the cause. At the same time, personnel working in the vicinity of the main transformers observed the deluge system actuation. Operations personnel verified no actual fire had occurred and the deluge system was isolated at 1450 hours. Operations reported that annunciator window H-E1, MAIN TRANSFORMER TROUBLE, had actuated three times but did not lock in, between the time when the deluge system activated and it was isolated. Subsequent testing of the alarms was performed with no problems found. This alarm was later attributed to a leaking gasket on the transformer cabinet door which allowed water from the deluge system to leak into the cabinet and drip on to terminal points associated with the transformer alarm system causing the intermittent alarms. The transformer cabinet door gasket has been repaired.

On June 11, 2003, at 1453 hours the Unit 1 Main Transformer Lockout Relay Turbine Trip signal was received resulting in a turbine trip/reactor trip. Control Room personnel responded to the event in accordance with emergency procedure E-0, Reactor Trip or Safety Injection. Control Room personnel stabilized the plant using ES-0.1, Reactor Trip Recovery. Initially, Reactor Coolant System (RCS) (EIIS System AB) pressure and temperature decreased to approximately 1952 psig and 544 degrees Fahrenheit respectively. Subsequently, RCS pressure and temperature returned to their normal program values.

Following the reactor trip the Reactor Protection System (RPS) and all Engineered Safety Feature (ESF) (EIIS System JE) equipment responded as designed including proper operation of AMSAC, and the Auxiliary Feedwater System (AFW) (EIIS System BA). The post trip response progressed as expected and the Operators transitioned to 1-ES-0.1, Post Trip Recovery. The plant was stabilized at no-load conditions. During the reactor trip recovery the main steam dump valves (EIIS System-SB, Component-TCV) did not initially operate as expected. The steam dump valves opening momentarily when the Operator tried to match controller output to the steam dump demand indicator not realizing the indicator needle was stuck in position. Once the steam dump valves began to open they were immediately closed and the steam dump controller was set to 5 percent in manual steam pressure mode. At this point the valves operated as expected.

At 1718 hours a 4 hour Non-Emergency Report was made to the NRC in accordance with 10 CFR 50.72 (b)(2)(iv)(B) for an event causing actuation of the Reactor Protection System when the reactor is critical. An 8 hour Non-Emergency Report was also made to the NRC in accordance with 10 CFR 50.72 (b)(3)(iv)(A) for an event causing actuation of the Auxiliary Feedwater System.

Following repairs and testing of station equipment the unit was restarted and returned to 100 percent power at 0200 hours on June 22, 2003.

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

This event posed no significant safety implications because the RPS and ESF systems functioned as designed following the reactor trip. The post trip response progressed as expected and the plant was stabilized at no-load conditions. Therefore, the health and safety of the public were not affected by this event.

This event is reportable pursuant to 10 CFR 50.73 (a)(2)(iv) for a condition that resulted in an automatic actuation of any engineered safety feature including the reactor protection system.

3.0 CAUSE

The main transformer lockout relay turbine trip signal was caused by actuation of the fault pressure relay (EIIS Component RLY). The leads from tap number 6 on the high voltage winding had come loose from the connection to the no load tap changer and had come in contact with the transformer tank wall. When the leads contacted the transformer wall, an arc was created which produced a pressure spike internally in the transformer. This pressure spike was detected by the fault pressure relay resulting in a trip signal.

The cause of the number 6 lead on the no-load tap changer to disengage from its mechanical termination point is attributed to improper assembly during manufacturing. The lead fell against the transformer oil tank and arced to ground. No hardware was missing and only minor arcing was observed where the lead struck the tank. Each lead has a spade type lug that is open at the end. The leads are installed on the no load tap changer stud with a stationary contact ring above and two nuts and a washer below securing the lead in place. Initial inspection of the mechanical termination point noted that the two nuts were tightly secure to each other.

Actuation of the deluge system on the "C" Main Transformer seven minutes prior to the Unit 1 trip was not the cause of the trip. The actuation of the deluge system was valid based on the fact that there were multiple arc strikes on the transformer tank wall. When the leads from tap number 6 first came in contact with the tank wall and produced an arc, a pressure spike was created. One of the pressure relief devices detected this spike and lifted slightly, but not enough for the fault pressure relay to detect the pressure change and also not enough for the alarm contacts on the pressure relief to makeup. When the pressure relief lifted a small amount of hot oil or gas escaped from the transformer. This was detected by the deluge system heat detectors. These detectors actuate at 225 degrees F but are also rate compensated such that a rapid change in temperature will cause them to actuate. This change in temperature caused the deluge system to actuate.

When the leads first struck the transformer wall, the arc-created gas bubble blew the leads back away from the tank wall. Subsequently, the leads again contacted the tank wall. It was at this time that a second arc created a pressure spike of sufficient magnitude to actuate the fault pressure relay and in turn initiated the Unit 1 trip.

Cause of the steam dump valves opening momentarily was the result of the Operator trying to match controller output to the steam dump demand indicator not realizing the indicator needle was stuck in position. Once the steam dump valves began to open they were immediately closed. Investigation found no problems with the calibration of the steam dump controls. The demand indicator was subsequently replaced and tested satisfactorily.

4.0 IMMEDIATE CORRECTIVE ACTION(S)

Control Room personnel responded to the event in accordance with emergency procedure E-0, Reactor Trip or Safety Injection. Control Room personnel stabilized the plant using ES-0.1 Reactor Trip Recovery. All safety systems responded appropriately. The unit was stabilized at no-load conditions, the MFW System (EIIS System SJ) was placed in service to all three steam generators (EIIS System AB, Component SG) and the AFW System secured and returned to normal Auto/Standby alignment.

5.0 ADDITIONAL CORRECTIVE ACTIONS

Initial inspections of each of the six tap leads to the no-load tap changers in the Unit 1 "A", "B" and "C" and two spare transformers showed the nuts to be tightly secured to each other. Some of the leads were loose beneath the nuts but still fastened to the no-load tap changers. It appears that the stationary contact rings have come loose over time. Inspection of the leads in the Unit 1 spare transformer noted all connections were tight. Each of the six leads to the no-load tap changers in the Unit 1 "A", "B" transformers, Unit 2 spare transformer and the 5 remaining leads on the "C" no-load tap changer were subsequently disassembled, inspected and found to be in satisfactory condition. The stationary contact rings were tightened and connections were remade.

Inspection of the Unit 2 spare transformer noted one of the leads was loose however this transformer has ring type lugs and would not have disengaged in a similar fashion. The loose lead was subsequently tightened. The Unit 2 main transformers are made by a different manufacturer and have crimped connections instead of the spade type lugs.

Electrical damage to equipment beyond the main transformer was evaluated and no other electrical equipment concerns were identified.

6.0 ACTIONS TO PREVENT RECURRENCE

Completed corrective actions should preclude recurrence. Additional enhancements are being evaluated as part of the root cause evaluation and will be implemented as appropriate. The remaining transformers at the station are manufactured by Westinghouse or General Electric. The General Electric transformers use a crimp connection and the Westinghouse transformers use a double lug connector.

7.0 SIMILAR EVENTS

LER N2-00-001-00 dated April 25, 2000, documented an automatic reactor trip on Unit 2 as a result of a secondary feeder cable failure on the 2C station service transformer.

8.0 ADDITIONAL INFORMATION

At the time of this event Unit 2 was operating at 100 percent power and was not affected by this event.

Transformers at the station include:

Unit 1 Main Transformers (3) manufactured by McGraw - Edison
Spare Main Transformers (2) manufactured by McGraw - Edison
Unit 2 Main Transformers (3) manufactured by General Electric
Units 1 and 2 Station Service Transformers (6) manufactured by Westinghouse
Reserve Station Service Transformers (4) manufactured by General Electric

Component failure information:
Description: Main Transformer
Manufacturer: McGraw - Edison
Serial No.: C-06625-5-3